



United States
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Forest Service

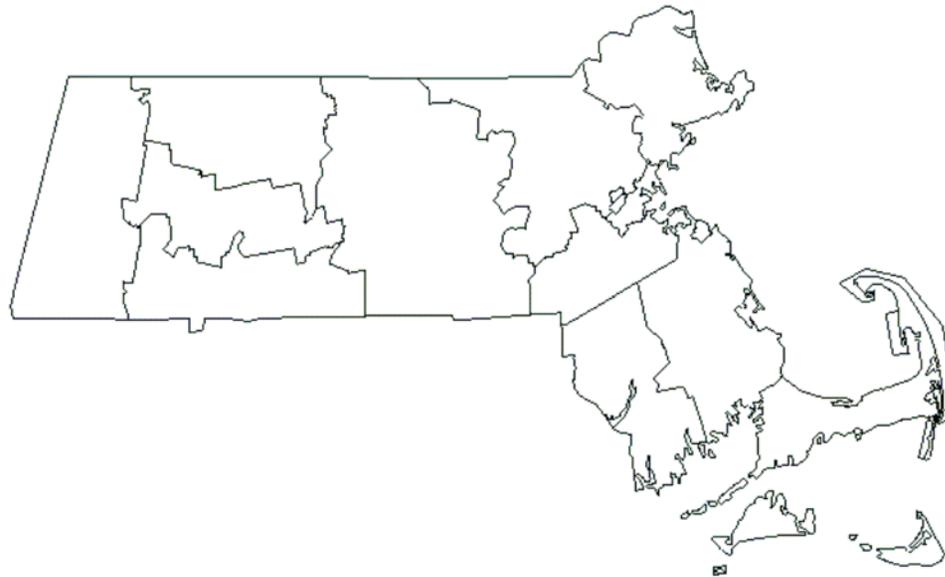
Northeastern
Research Station

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Forest Health Monitoring in Massachusetts

1996-1999



MASSACHUSETTS

The National Forest Health Monitoring (FHM) program monitors the long-term status, changes and trends in the health of forest ecosystems and is conducted in cooperation with individual states.

In Massachusetts, 32 FHM plots were established in 1990 (Fig. 1). Each point in Figure 1 represents the status and approximate location of one FHM plot. Each plot is a set of four fixed-area circular plots. Most tree measurements are made on four 1/24-acre subplots. Seedling and sapling measurements are made on four 1/300-acre microplots, located within the subplot.

All plots were visited at least once between 1996 and 1999, and nine to twelve plots were sampled each year. This report summarizes the most recent conditions.



Figure 1.—Current status and approximate locations of Forest Health Monitoring (FHM) plots in Massachusetts.

Plot Characteristics

- 22 of the 32 plots were at least partially forested.
- 59 percent of the 32-plot area was forested.
- 57 percent of the forested areas were of the maple-beech-birch forest types; the second most common group was the oak-pine forest types, accounting for 29 percent of the forested area. Oak-hickory forest types accounted for 11 percent of the forested area.
- 75 percent of the forested areas were in sawtimber-size stands with the remainder of the forested areas in poletimber-size stands.
- 44 percent of the forested areas were in stands that were more than 60 years old; 44 percent of the forested areas were in stands that were 41 to 60 years old; and 12 percent were in stands that were 21 to 40 years old.

Plot Structure (Table 1)

Seedlings

- Other maple, mainly striped maple, seedlings (12 inches tall, less than 1 inch diameter) were most abundant, accounting for 12 percent of the 386 seedlings counted.
- The five most abundant species groups collectively accounted for 51 percent of the seedlings. They were other maple, select red oak, other birch (mainly sweet birch), select white oak, and red maple.

Saplings

- Red maple saplings (1 to 4.9 inches d.b.h.) were the most abundant, accounting for 26 percent of the 91 saplings counted.
- The six most abundant species groups collectively accounted for 69 percent of the saplings. They were red maple, other maple, American beech, other birch, black cherry, and eastern hemlock.

Trees

- Red maple trees (5 inches d.b.h. or greater) were the most abundant, accounting for 23 percent of the 532 trees counted.
- The five most common species groups collectively accounted for 68 percent of the trees. They were red maple, select red oak, eastern white pine, eastern hemlock, and other birch.

Table 1. -- Numbers of trees by size class, and species groups, Massachusetts, 1996-99. Rankings of species quantity appear as superscripts beside numbers.

Species	Size Class		
	Seedlings	Saplings	Trees
Eastern hemlock	11	6 ⁵	48 ⁴
Eastern white pine	24	5	69 ³
American beech	16	9 ³	10
Other birch	39 ³	8 ⁴	37 ⁵
Black cherry	14	6 ⁵	1
Red maple	32 ⁵	24 ¹	120 ¹
Other maple	48 ¹	10 ²	-
Select red oak	43 ²	2	90 ²
Select white oak	35 ⁴	1	19
All softwoods	36	15	126
All hardwoods	350	76	406
All trees	386	91	532

Table 2. -- Mean plot values and percentage of trees with ratings of specified values, by crown variable, Massachusetts, 1996-99. (plot means based on 22 forested plots; percentage of trees based on 532 live trees 5 in. or more in d.b.h.)

	Value
<u>Crown Dieback</u>	
Plot Mean	7.6 %
Trees with $\leq 5\%$ dieback	68
<u>Foliage Transparency</u>	
Plot Mean	14.6 %
Trees with $\leq 30\%$ transparency	97
<u>Crown Density</u>	
Plot Mean	46.8 %
Trees with $> 30\%$ density	87

Tree Condition

Crown Dieback (Table 2; Fig. 2)

Crown dieback refers to recent mortality of branches with fine twigs and is measured as a percentage of the tree crown. Low dieback ratings (5 percent or less) are considered to be an indicator of good health. High dieback ratings indicate poor health.

- 68 percent of the trees had low dieback ratings; average dieback was 8 percent.
- 1.2 percent of the trees had high dieback ratings (more than 20 percent affected crown).
- 55 percent of red maple had low dieback ratings; 2.5 percent had high dieback ratings.

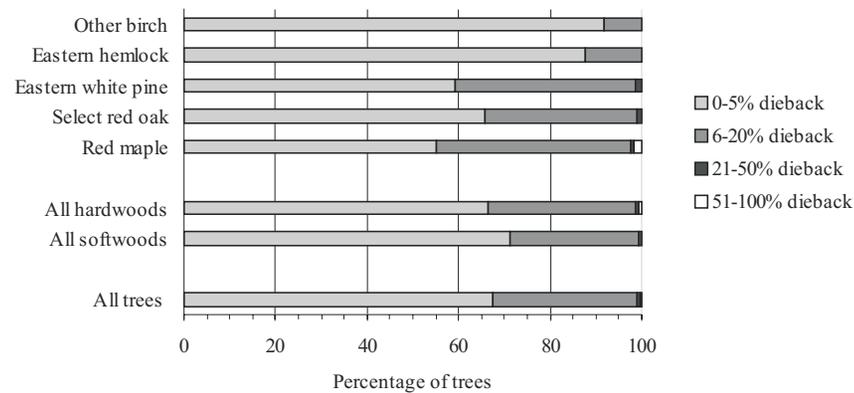


Figure 2. – Distribution of crown dieback ratings for trees in Massachusetts, 1996-99.

Foliage Transparency (Table 2; Fig. 3)

Foliage transparency is the amount of skylight visible through the live, normally foliated portion of the crown. Foliage transparency estimates the crown condition in relation to a typical tree for the site where it is found. Low transparency ratings (little visible skylight) indicate a full and generally healthy crown; high transparency ratings indicate a sparse crown. Transparency ratings of 30 percent or less are considered normal for most trees.

- 97 percent of all trees had normal transparency ratings; average transparency was 15 percent.
- 3 percent of the trees had high transparency ratings (more than 30 percent affected crown).
- 7 percent of both red maple and eastern white pine had high transparency ratings.

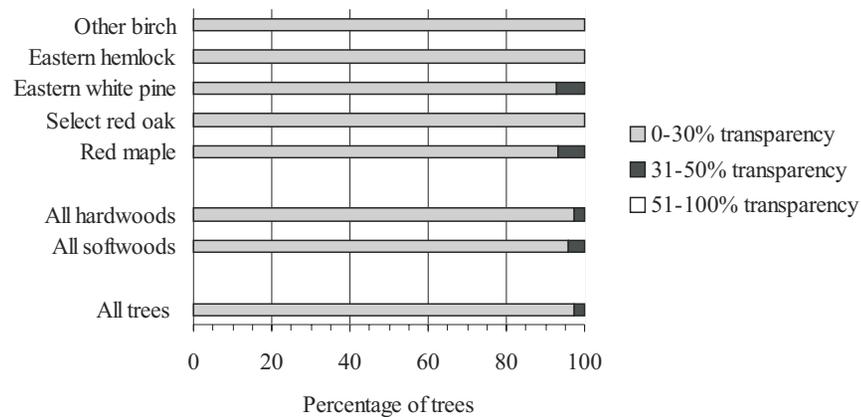


Figure 3. – Distribution of foliage transparency ratings for trees in Massachusetts, 1996-99.

Crown Density (Table 2; Fig. 4)

Crown density is the percentage of crown area where sunlight is blocked by crown branches, foliage, and reproductive structures. Crown density estimates crown condition relative to a typical tree for the site. Density also serves as an indicator of future growth. High density ratings (greater than 30 percent) indicate a full, healthy, crown.

- 87 percent of the trees had high density ratings; average crown density was 47 percent.
- 13 percent of all trees had low crown density (30 percent or less); 23 percent of white pine trees had low density ratings.

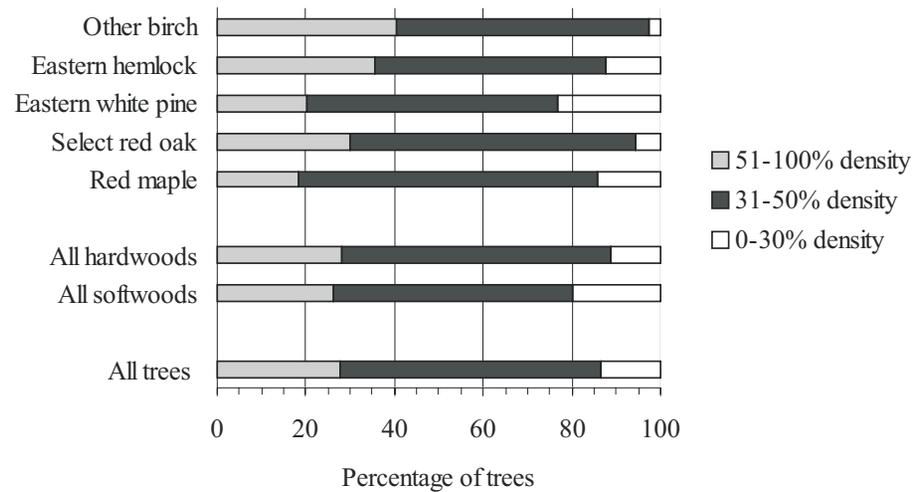


Figure 4. – Distribution of crown density ratings for trees in Massachusetts, 1996-99.

Tree Damage

Signs and symptoms of damage were recorded if the damage could kill the tree or affect its long-term survival. The 11 categories of damage used in this report were: cankers and galls, decay, open wounds, resinosis and gummosis, cracks and seams, vines, dead or broken tops, broken branches, other bole and root damage, other crown damage, and other damage (not otherwise defined).

- 84 percent of trees had no significant damage, 14 percent had one damage, and 2 percent of the trees had two or more damages.
- 62 percent of 96 damages were decay; 14 percent were dead or broken tops; and 9 percent were cankers and galls.
- 73 percent of red maple had no damage. More than three-quarters of the damages on red maple were decay.

Summary

Massachusetts has mature forests dominated by hardwood species. Most of the trees are healthy, with full crowns (low transparency, high density), little dieback and little damage. Red maple trees made up almost one-quarter of the trees and had slightly higher amounts of dieback, thinner crowns, and more damage than other common tree species.

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Acknowledgments

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